BULLETIN 354 (Revised December 1937) JUNE 1936

CORNELL BULLETIN FOR HOMEMAKERS

PREPARED BY THE NEW YORK STATE COLLEGE OF HOME ECONOMICS AT CORNELL UNIVERSITY AND PUBLISHED BY THE NEW YORK STATE COLLEGE OF AGRICULTURE AT ITHACA, NEW YORK. L. R. SIMONS, DIRECTOR OF THE EXTENSION SERVICE

THE DEVELOPMENT OF A SUCCESSFUL KITCHEN

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PUBLISHED AND DISTRIBUTED IN FURTHERANCE OF THE PURPOSES PROVIDED FOR IN THE ACTS OF CONGRESS OF MAY 8, AND JUNE 30, 1914

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THE DEVELOPMENT OF A SUCCESSFUL KITCHEN

ELLA M. CUSHMAN

Probably every homemaker has in the back of her mind a picture of an ideal kitchen. Built up from many magazine advertisements, this mental picture probably includes a double window over a sink of green or ivory porcelain enamel or of shiny metal, with drainboards at each

FIGURE 1. PORTABLE KITCHEN AT THE NEW YORK STATE COLLEGE OF HOME ECONOMICS

In this "portable kitchen," walls and equipment can be moved about to try different arrangements. The cupboards are made of second-hand washstands raised and made adjustable in height. The movable sink is set into a frame on legs which are also adjustable in height. The cupboards and shelves are so arranged that utensils and dishes can be obtained with minimum effort. Roller shades are used in place of cupboard doors. The work surface for beating operations at the right of the sink is lower than that at the left, since in beating the hands are held 6 or 8 inches above the table surface. Notice the shelf on the cupboard door for the sugar can; here the doors do the work

end; on either side symmetrical built-in cupboards are as tidily closed, and as immaculately neat, as are the shiny enamel range and the electric refrigerator. Probably linoleum or rubber tiling cover the floor, cottage curtains are at the windows, and the whole is brightened and made satisfying by a color scheme—perhaps ivory with green, or buff with red and

FIGURE 2. KITCHEN PLANNED TO MEET A FAMILY'S NEEDS

A kitchen planned from the portable equipment (figure 1) is shown in figures 2 and 3. The continuous work surface, covered with rubber, projects 4 inches over the lower cupboards to provide toe room. Under the sink in the right-hand cupboard is a small door through which the milk bottles are put every morning by the milk man. The homemaker who works in this kitchen prefers cupboard doors to open shelves, although her cupboards when open add charm to her kitchen; they are painted light green inside, a good background for dishes of any color. Notice the shelves of different widths and the metal stripping which makes it possible to remove or adjust them. The floor is of rubber tiling of a mottled pattern which does not show dirt readily. Inside the small door in the lower end of the right-hand cupboard near the floor (lower right corner of illustration) is a dust pan invented by the man of the house; it is a metal container fitted into the space and let down into the floor, and equipped with a handle which can be reached from the basement. The dirt from the kitchen floor can be swept into this container and emptied from the basement as often as necessary

black. Most women think of a kitchen such as this the minute the words "ideal kitchen," "model kitchen," or "kitchen improvement" are spoken. Every homemaker longs for such a kitchen, but few can have it because of the cost; so the "model" kitchen stays in the magazine, while the homemaker stays in the dreary, inconvenient kitchen which chance has provided.

Some homemakers, however, are seeing beyond the "model" kitchen and are gaining a vision of a living, cheerful kitchen in which family life

is more than fed, where it is warmed and heartened and held together. These are the "successful," rather than "model," kitchens, and such successful kitchens are being made every day.

The successful kitchen cannot be easily pictured because it is different in each home; but it does not necessarily cost money, and anyone who is

FIGURE 3. A WELL-LIGHTED SINK

In this view of the same kitchen shown in figure 2, the telephone is shown on a shelf fastened to a small door which, when opened, swings the telephone into the adjoining room. The electric fixture over the sink throws light directly onto the sink without glare in the worker's eyes. Curtains of yellow gingham frame the window but do not shut out light and air

willing to work for a successful kitchen may have one. It does not belong to the homemaker alone, but to the family. It is not small. It is not large. The color scheme is that which the family enjoys most. It contains ingenious conveniences which have been planned and constructed by members of the family. But the best thing about the successful kitchen is that all enjoy using it. In its development and use the family finds an outlet for creative ability. It is their kitchen.

A homemaker may never have thought that improving her kitchen might be important or desirable, and perhaps it may not be. But, if in her day's work she is habitually tired and often irritable, if the eternal round of meals and dishwashing takes half her joy out of life, if it seems

that she never has time to do the things she wants to do, if the children are uninterested in kitchen work and do it poorly, if at all, and if her husband is cross, she would do well to look impersonally at her kitchen to see whether she can discover there a cause for any of her difficulties.

Before starting to improve her kitchen, the homemaker might well discuss with the family the importance of the undertaking, and see what resources are available. Such resources may possibly be money and materials, but will more often be the time and energy of some member or members of the family, their ideas and the ability to work them out. These resources should be thoroughly considered, in order to make the most of them. An analysis of kitchen tasks to determine the quickest, easiest, and most satisfactory ways of doing them can be made by members of the family working together, or at kitchen conferences to which neighbors or homemaking classes in the school are invited to contribute their ideas. Visiting homes in which improvements have been made is an excellent way to get ideas, and can be done by neighborhood calls or by attending community or county tours conducted by the state extension service in home economics.

Experimentation is one of the best ways of getting the "feel" of a new arrangement before actually adopting it. The kitchen floor plan may be drawn to scale with chalk on a large floor space, as in a barn, or grange hall, or school laboratory. Portable equipment made from second-hand furniture, or even from packing boxes cut to duplicate actual equipment in size and shape, may then be moved around in different positions. This method is most successful if the homemaker can use such improvised arrangements for the activities of a typical day's work—those connected with entertaining and with such emergencies as caring for the sick—before deciding upon the arrangement to be adopted. The kitchen in figures 2 and 3 (pages 4 and 5) was planned from the portable equipment shown in figure 1 (page 3).

Much has been written concerning kitchen planning, but this should be studied critically, since what may be successful in one home may not be practical in another home in which conditions are different. Weighing values and making final decisions is the hardest part of the undertaking. Often one set of values will have to be sacrificed to obtain another and it is sometimes difficult to decide which in the end is the more important as far as family welfare is concerned. The last step in the project is to carry out the improvements which the family has finally decided upon. Sometimes this last step is never taken, perhaps through inertia, perhaps for some trivial reason, and the family continues, often for years, to work inefficiently in an inconvenient and drab kitchen for lack of a little will power and effort that might change the entire aspect of kitchen work.

HOW THE KITCHEN AFFECTS FAMILY LIFE

How can one go about to obtain a successful kitchen, one that will help achieve happy family relationships? What, concretely, can any woman or any family do?

In general, well persons are happier than those who are tired or sick, and the relationship between well persons is likely to be more satisfying than that between those who are not well. Also, free time for family activities contributes to good feeling. The kitchen, then, to be most successful, must be so arranged, equipped, and manned that it will affect the health of each family member favorably and will give the most free time to all members of the family. In general, also, it is more tiring to do a disagreeable task under compulsion than to do the same task voluntarily under pleasant conditions. The successful kitchen is one in which the performance of kitchen tasks has as few disagreeable features as possible and in which the homemaker is the master rather than the slave of the work to be done. Moreover, persons who are fond of each other usually enjoy doing thing together; it is an increased satisfaction to share one's own or another's achievement.

The successful kitchen, then, must be so arranged and equipped and the work in it so organized and performed by members of the family that these satisfactions result. This may sound idealistic and impractical, yet such a result may go far toward answering the questions: Why do so many young persons dislike household activities? Why do they go outside of the home for their satisfactions? Why is there so often a complete misunderstanding and lack of comradeship between parents and children?

EFFECTS OF FATIGUE ON THE FAMILY

Since fatigue is one of the greatest enemies to happy family relationships, it should be considered carefully—just what it is, what it does, what causes it, particularly in the kitchen, and how it can be controlled there. Research on fatigue has been carried on in recent years both at Mellon Institute, by H. M. Johnson, and at Colgate University, by Donald Laird.

Briefly, fatigue is caused through exercise by the breaking down of cell tissues into poisons which are produced more rapidly than they can be burned up or changed into harmless chemical products. Oxygen, carried through the body by red blood corpuscles, is the agent that renders such poisons harmless. Some of these poisons are alcoholic, and, if allowed to accumulate in the body by over-exercise or by lack of sufficient oxygen, will change the entire personality, just as does over-indulgence in intoxicating liquor. In fact, the results are much the same in kind. Allowing one's self to become intoxicated with fatigue may be compared to allowing

one's self to become intoxicated with liquor. Uncontrolled emotions cause a kind of fatigue perhaps more serious than physical fatigue. Strong emotions such as fear, anger, or grief produce unusual amounts of glandular secretions in the system, and these again cause unfavorable changes in personality. One manifestation of anger is resentment or revolt against a disagreeable situation that one feels helpless to change.

Perhaps if a homemaker thinks back over a day on which she was overtired, she will recall that it was the unimportant happenings at which she became irritable, scolded the children, nagged her husband, and may even have been reduced to tears of self-pity. In other words, she completely lost her perpective and her usually equable disposition, and this in its turn had its effect on family relationships and on her own happiness. It is well for each woman, and each family, to consider to what extent the kitchen contributes to this distress and fatigue, and how much of this could be eliminated. It is irritating accumulatively to spend a great deal of one's day working in a place haunted by the same old inconveniences and the same old drabness.

WORK CENTERS AND STORAGE SPACES IN THE KITCHEN

No rules for kitchen planning are infallible in all situations, but certain fundamental principles, if observed, will help to create a kitchen that is convenient and attractive, and one in which the family can have a part.

The kitchen divides itself naturally into work centers; the secret of convenient arrangement is to have everything which is used at each work center so placed that it can be easily and quickly reached with as few motions as possible, and to have each work center near the others with which it is most commonly used. The work centers found in most kitchens are: range center, sink center, food-preparation center, food-storage center, and planning center. Cupboards and drawers are important considerations in most of these work centers. Most farm kitchens and many city kitchens have a dining center and many have a laundry center.

Range center

Water is used at the stove, and food is cooked there after being prepared at the sink or at the food-preparation center. For greatest convenience, therefore, the cooking center should be within easy reach of both these centers. Shelves or a cupboard at the stove for the utensils and supplies used there add to convenience, and a counter or table beside the stove (figure 4, page 9) is useful when placing the hot food in the serving dishes. If a wood range is used, a wood box opening from the woodshed on a level with the top of the stove (figure 5, page 9) and filled from outside is convenient. It also avoids the litter caused by bringing wood into

FIGURE 4. CONVENIENT RANGE CENTER

The porcelain-topped table at the left of the stove is convenient for certain cooking operations and for putting the cooked food into the serving dishes. The utensils and supplies used at the stove are conveniently arranged. The drop-leaf table under the window can be let down when not in use

FIGURE 5. BUILT-IN WOOD BOX

This wood box, filled from the wood shed, opens on the level with the stove

the kitchen, and minimizes the danger of fire from sparks falling into the wood box.

If there is a central heating system, for the sake of convenience and comfort it is better to have the kitchen heated by this system and to use for cooking a stove which does not heat the kitchen. Electric and gas ranges are both clean and easy to operate and care for. The cost of operation can be reduced by using proper utensils and taking care not to waste the electricity or gas. Usually the added convenience may be worth any additional cost of operation over other fuels. Bottled gases are used for fuel where natural gas or electricity is not available, and gasoline stoves are now on the market that can have the gasoline tank kept outside the house for added safety. If coal or wood stoves are used for cooking, it is usually desirable to have an oil or electric stove for summer use, but this causes inconvenience because it is difficult to arrange two stoves in a kitchen in such a way that the work can be done efficiently. A good oil stove (kerosene), properly used and cleaned daily, is inexpensive to operate, does not overheat the kitchen, and makes a good year-round stove for cooking. An oil stove is now on the market which has a built-in oven, a hot-water reservoir, and a removable skeleton griddle for which a solid section for heating the kitchen can be substituted. The water is heated by a copper coil surrounding the giant burner. The cost of operation is naturally greater than for an ordinary oil stove; therefore, before purchasing such a stove, comparison should be made with the cost for gas and electricity.

Many families in New York State have installed oil burners in coal or wood ranges. Some of these burners have proved satisfactory and others have not. The success seems to depend upon the quality of the burner, the amount of air space in the fire box, and the knowledge and skill of the person making the installation. Oil burners in ranges have the disadvantage of heating the kitchen in hot weather.

Wood, when available on the farm, is usually the most practical fuel to use, but it would not be cheap if the labor of cutting and hauling, of keeping the wood box filled, of removing ashes, and of keeping the kitchen clean had to be paid for. Less work is involved in the care of a coal stove, but the dirt from it is somewhat greater and the cost of operation is higher than with a wood stove. A new insulated coal range that does not heat the room and is cheaper to operate than any other type of coal range is now on the market. It requires eight pounds of coal a day and is filled once a day. At present, however the initial cost is great.

Combination ranges, combining coal and electricity or coal and gas, are being used in some homes in which it is necessary to heat the kitchen with the cook stove. Such stoves have the advantage of occupying less space

than two heating units. A small two-burner coal range is manufactured that can be installed beside an electric or gas range, thereby using up no more space than a combination stove.

Sink center

At the sink, dishes are washed and water is used in preparing vegetables and other foods. It is therefore best to have the sink within easy reach of both the stove and the food-preparation center. A shelf or narrow cupboard over the sink or set into the wall is convenient for dish-washing supplies and equipment. If windows are over the sink, these supplies can be placed at one side of the windows. Sauce pans and a paring knife hung at the sink are handy for preparing vegetables there. A shelf for dish pans and a drain basket under one-half of the sink is more convenient than hanging them or carrying them to another room. This leaves room for a stool or a step-on garbage container underneath (figures 1 and 6, pages 3 and 11).

FIGURE 6. CONVENIENT KITCHEN SINK

This kitchen was planned by the use of the portable kitchen shown in figure 1 (page 3). Notice the racks for spices on the cupboard doors, and shelves and compartments to fit the utensils. The long sink accommodates two oblong dish pans and a drain basket. The counters and the wall behind them are covered with linoleum. An outlet is conveniently placed for an electric beater

Many types of sinks are available, ranging in price from $5 to $150. Stainless metal sinks are the most expensive and have to be made to order, but are probably the most durable if properly cared for. Enameled iron or steel sinks are next in expense; the price varies according to the quality of the enamel, stain-resisting enamel being most expensive. Blue or gray granite-iron sinks are less expensive.

To make a wise selection of a sink, it is helpful to ask one's self the following questions: How much am I justified in spending for a sink, considering other needed conveniences? What is the most efficient method of washing dishes? Do I intend to teach my children to wash dishes? Do I want them to enjoy this activity? Would porcelain or enameled-iron drainboards affect the breakage of dishes? Would drainboards deprive me of necessary flat-work surfaces at either end of the sink? Is it easier to scald dishes on a drainboard or in a sink?

A three-foot enameled iron or steel sink without back or drainboards is probably the least expensive type that will give excellent service if properly cared for. An efficient use of an enameled iron sink without drainboards, as worked out by a New York State homemaker and duplicated for a State Fair exhibit, is shown in figure 7. A temporary back can be made at home and covered with oilcloth. This can be replaced later by a back like the sink if desired. For good service it is important to know that scouring powder used on an enameled sink is likely to roughen the surface so that stains are absorbed. Tri-sodium phosphate or whiting soap paste with a little kerosene, neither of which roughens enamel, is satisfactory for cleaning sinks.[1]

The size and design of a sink determine to a great extent the ease with which dishwashing is done and it is well worth while to try different methods of washing dishes before selecting a sink. The most beautiful and expensive sink is not always the most efficient. Any neighbor will probably be glad to let one wash her dishes in order to try different types of sinks. A mixing faucet is an aid to kitchen work, as is also a strainer built in the sink.

If running water is not available and a pump is used, the position of the pump at the sink is important. A pump may be placed towards the back of the sink shelf or drainboard (figure 8, page 14), and turned so that the handle interferes as little as possible with the dishes on the drainboard.

In many homes the kitchen sink is used as a lavatory. Sometimes the homemaker gives up the sink to the men for this purpose and regularly washes dishes on the stove or table. This, of course, means harder work for her, since water has to be carried to and from the sink. When the

[1]For directions for making whiting soap paste, see *Letters from a homemaker to her friend on housecleaning*, p. 12-13, by Ella M. Cushman. Cornell Extension Bulletin 262. 1933.

FIGURE 7. DISHWASHING CENTER

Easy dishwashing depends largely upon the arrangement and the equipment of the dishwashing center. The one here pictured is the result of two months of careful study, and took first prize at the New York State Fair. The 30-inch sink here shown holds one dish pan and a round drain basket. A 36-inch sink would accommodate two dish pans. This type of sink is less expensive than one with drainboards attached. The combination faucet adds convenience. In place of drainboards are second-hand washstands with the legs raised; the tops, widened to the width of the sink, are covered with linoleum cemented to them with linoleum cement, and the edges are protected by a molding. These cupboards have been painted inside and out. The shelf over the sink holds painted cans of water softener and soap flakes, with the tools used in dishwashing hung underneath. The lighting fixture throws the light on the sink and protects the worker's eyes from glare. The free space under the sink provides toe and knee room, places for the step-on garbage container, the dish pan, and the drain baskets. The towel rack at the left can be swung back out of the way when the towels are dry. The stove at the right heats the water for scalding dishes. The dish cupboard above the left-hand work surface is convenient to the dining room. The small table with shelf below and tray on top has been equipped with rubber-tired swivel casters and makes a satisfactory service wagon. In this kitchen, dishes are scraped and stacked on the service wagon in the dining room and are wheeled to the sink, saving at least one handling of dishes and perhaps several trips to the kitchen. The round dish pan and one round drain basket, to which handles have been added, are placed in the sink. Silver and glasses are washed, placed in the drain basket, scalded, and the basket is lifted to the left-hand work surface to dry while a second drain basket is placed in the sink. By the time the second basketful of dishes is washed and scalded, the first is practically dry; the glasses are polished and placed in the cupboard above, while silver, as it is wiped, is placed in a compartment box in the drawer. The second basket is then placed on the work surface to dry, the first basket is put back into the sink, filled, scalded, and allowed to dry while the other dishes, dry by this time, are put away. Rinsing a few dishes at a time with very hot water makes them dry quickly without streaking, saves work, and is sanitary. The method of dishwashing found most satisfactory in each home will depend upon the number in the family, the arrangement of the kitchen, the amount of money to be spent, but most of all upon careful thought and experiment

sink is used for both, as a lavatory and for kitchen work, family friction is likely to occur; probably all members of the family would be happier if they could have a separate place for washing. If a new sink is to be provided, the old sink might be kept and used for toilet purposes, but a small sink or lavatory can be bought very inexpensively, perhaps second hand. A washstand with bowl and pitcher and mirror above might be a solution to the problem in some homes. A lavatory, at least on the first floor, is desirable if it can be managed.

For the health of the family, probably running water and sewage disposal are the most important conveniences in the kitchen and in the house, with the exception of a heating unit. Sometimes a water- and sewage-disposal system is lacking in a home because persons are not conscious of its

FIGURE 8. NO PLACE FOR THE SINK

The walls of this old farm kitchen were so cut up by windows and doors that no wall space was left for a sink convenient to the other working equipment; therefore, the sink was placed in the middle of the floor. Ordinarily, equipment placed in the center of a kitchen is inconvenient because one has continually to walk around it. This is not true in this kitchen, however. The outside door is opposite the cabinet and the dining-room door is opposite the opening between the cabinet and sink. Dishes can be washed at either side of the sink, and the pump is so placed that the right-hand counter can be used for draining dishes. When running water is available, the faucets can be placed where the pump now is. The homemaker says this improvement has saved her approximately 95 hours and 28 miles of travel a year in preparing and cleaning up after the breakfast for a farm family of eight. The greatest advantage was the relief from congestion around the stove, where the woman had formerly washed her dishes and where the men came to get hot water for washing

health value and sometimes a householder is uncertain as to the possibility of installation. More often, perhaps, the total cost seems prohibitive because families feel that the entire system must be installed at one time, and they would not be satisfied with less than the most beautiful and most expensive equipment. These conveniences are far more imporant from the health standpoint than are such conveniences as cupboards, cabinet, floor covering, paint and wall paper, refrigerator, or the like.

Help with the engineering problems in the installation of water and sewage-disposal systems may be obtained from the New York State College of Agriculture, at Cornell University, Ithaca, New York, either by personal conferences with the agricultural-engineering specialists, scheduled through the farm- and home-bureau offices in the county, or by bulletins from the College.

After a plan for the installation has been made, it can be carried out over a period of years, thereby cutting down the yearly cost. With a little help most farm men can install their own systems, and satisfactory equipment can often be picked up second-hand at small cost. This can be replaced by better equipment later if desired, while in the meantime the

advantages of hot and cold running water and sewage disposal may be enjoyed and appreciated. The surest way to obtain this convenience is, first, to make a plan, and then, to start a fund. It will be amazing how much money can be diverted from unnecessary expenditures into this fund. Again from the health point of view, an indoor toilet is perhaps the most important part of the installation and should probably be installed first. The kitchen sink is a close second, and hot running water third.

Food-preparation center

The test of a convenient food-preparation center is whether or not all the supplies and equipment used in connection with commonly cooked foods are at this center and whether the work surface is large enough and of the correct height for the worker.

It is a common practice to place cupboards above a work counter with deeper cupboards below (figure 6, page 11). In order to work easily at such a counter, it is important to have the upper cupboards as narrow as possible and high enough above the counter to give complete freedom

FIGURE 9. CABINET USED AS A PARTITION

This large farm kitchen contained so many windows and doors that the cabinet was kept in the dining room for lack of wall space in the kitchen, and cupboards, sink, and stove were on different sides of the room. By moving the cabinet at right angles to the cupboards, cutting off the cupboard doors, and placing the sink in the space thereby provided, a small convenient kitchen has been formed without expense. Shelves over the sink were made narrow to contain the dishes used every day. The cabinet, so placed, cuts off the view of the sink and work surfaces when the family is at the table, and forms a dining center. The kitchen and the cabinet have been painted a light color, and all working surfaces are covered with a cheerful linoleum

of motion. The upper cupboards need be only deep enough to contain the largest dish to be kept there. Twelve inches is usually a maximum depth. Sometimes these cupboards can be set into the wall, thereby decreasing the overhang approximately four inches. The upper cupboards are usually set about fifteen inches above the counter. If this seems too low, they can be put higher and a narrow shelf placed underneath for small utensils

FIGURE 10. SINK IN FRONT OF A TALL WINDOW

In this kitchen, ingenuity has brought the working centers together by placing the sink before a tall window. The dishwashing supplies are kept on the window sill behind the sink back, and may be kept from view outside by a piece of wall board or a glass curtain. This woman has used window shades instead of doors on cupboards for nearly two years and prefers them to doors. They roll up out of the way and the dishes get no more dusty than when kept in cupboards with doors. Each shade has a short string with a ring on the end, which, when fastened to a hook underneath the bottom shelf at the back, holds the curtain tight. The broad shelf on either end of the sink is covered with ivory linoleum ordered especially for this purpose. The edge is painted red to harmonize with the floor covering, and with the borders of the unbleached muslin curtains which are block-printed in red by the homemaker. The washstand at the right of the sink has one door equipped with a shelf for the garbage pail; the oil-stove oven occupies the other half of this space. The shelves under the left-hand sink shelf have been planned to fit the equipment kept there. The ringed curtain on the cupboard on the left moves easily on a brass rod

and cans of supplies (figure 19, page 25). The best height for these cupboards will depend upon the height of the worker, and can be tested by the use of boxes temporarily fastened to the wall. It is important to have the supports of the cupboard somewhat cut out under the bottom shelf to prevent shadows on the counter.

The cupboards beneath the counter are usually too deep for convenient storage of utensils. If this is true, small utensils may be placed in the upper cupboards or a false back of wallboard or even a molding may be so placed that utensils will not slip back out of reach. Sometimes a full-length cupboard can be provided with a counter by cutting off the doors at the shelf just above the one that is to be used as a counter. The upper

FIGURE 11. SAME KITCHEN AS IN FIGURE 10, CUPBOARDS CLOSED

cupboards can then be made narrower if desired (figure 9, page 15).

A successful food-preparation center need be neither elaborate nor expensive. One can be made from an ordinary kitchen table with shelves above, covered by roller shades or curtains. Old washstands have been made over into satisfactory work centers (figures 10 and 11, pages 16 and 17). The kitchen cabinet has staunch supporters. The food-preparation center will, however, be most useful if it can be planned and built around the things used there (figures 9 and 12, pages 15 and 18).

If the kitchen is to be wired for electricity, it is well to have a double convenience outlet at the food-preparation center for an electric beater or other electric appliances which one owns or plans to own in the future.

FIGURE 12. CAREFUL PLANNING OF UNUSED SPACE

In this small kitchen, available space on either side of the chimney has been intelligently used for the storage of dishes, supplies, and cooking utensils. The table at the right of the sink makes a convenient surface for mixing. It is within easy reach of utensils and supplies and but a step from sink, refrigerator, and stove. All vertical cupboard space has been utilized. Notice the pie-tin unit on the top shelf of the lower cupboard section. Since only the tops of the tins need to be reached, no stooping is necessary. The knife rack saves time and energy—and knives, since knives are dulled more from coming in contact with other metal than from actual use. Mixing bowls have been separated. Dishes are only one row deep on the cupboard shelves. A shelf has been placed under the sink for the dishwashing supplies. Although the refrigerator opens inconveniently for use at the work center, it is handy to the dining room at the right

This outlet may be placed on the wall at the back of the counter, or on the face of the lower cupboard in front of the counter, depending upon which seems most convenient (figures 3, 6, and 13, pages 5, 11, and 19).

Kitchen cupboards

The usual kitchen cupboards are inconvenient because the shelves are all of the same width, arbitrarily spaced, and stationary, making it necessary to place at least two rows of small articles on one shelf. Space must be left above these rows to extend the arm in, pick up an article in the back row, see if it is the one which is wanted, and bring it forward and out—a wasteful use of energy. Platters and large plates usually stand in the back and have to be carefully tipped and brought forward. In most

cupboards more space is wasted than is used, and the articles on the top shelves are inaccessible. Often this wasted space is utilized by hanging cups on hooks, but this is unhandy and too often results in breakage of the cups. Sometimes scalloped shelf paper or oil cloth hides part of the waste space but does not correct it and may not add to the beauty. Pie, cake, bread, and muffin tins and nests of kettles and of mixing bowls are often kept in a deep low cupboard or in the bottom section of a cabinet. Getting these out is an irritating and disagreeable process.

Cupboard shelves can be so planned that every article can be seen and reached with one direct motion, if the following procedure is carried out:

Take all the articles from the cupboards and dispose of those which are never used.

Sort the other articles according to their size and frequency of use.

Make paper patterns of the shelves, marking the arrangement of the dishes and the required distance between the shelves.

FIGURE 13. A WELL-LIGHTED KITCHEN

Here is an excellent arrangement of ceiling and side lights and electric outlets. The lights under the cupboards throw a good light on the counters. All the work surfaces have been finished with liquid bakelite. The cabinet forms a part of the continuous work center. The work surface in front of the right-hand window has a leaf which can be pulled out if desired. Over this work surface is a built-in lighting unit

Make the cupboard shelves movable and adjustable. Make some shelves narrower than others for the small dishes (figure 14, page 20).

Arrange the wide articles on the wide shelves and the small articles on the narrow shelves placed just above the larger articles, thereby using all verticle space and doing away with the necessity of reaching beyond one small article to get another one from behind.

Make racks on the cupboard doors (figure 6, page 11), for the very small articles such as salt shakers, spices, extracts, and the like; these racks should fit into the horizontal space provided by the narrowing of some of the shelves.

FIGURE 14. KITCHEN CLOSET BEFORE (LEFT) AND AFTER (RIGHT) IMPROVING

Consider the time that was wasted and the resulting irritation in finding the desired articles in the cupboard at the left. Compare this with the improved cupboard at the right. Notice that each article in the right-hand closet is in sight and can be obtained with the minimum number of motions. The floor is clear and can be easily cleaned. Special compartments take care of the bread box and pressure cooker. With no paper on cupboard shelves, cleaning is simplified. This closet is the only storage space in a small apartment

Make upright partition units (figures 1 and 15, pages 3 and 21) so that platters, trays, and pie, cake, bread, and muffin tins, and other nearly flat articles can be placed in them in an upright position. The front edges of these partitions may be slanted back or hollowed out in order that the articles can be easily grasped (figure 6, page 11). Such units may be made movable and may be used in a vertical or horizontal position as desired.

FIGURE 15. A REMODELED DISH CLOSET

The door of this closet, on which were hung thirty-five utensils, opened against the stove until the owner removed the door and substituted a curtain of plain material which can be easily opened and closed by pulling a cord. The stove utensils hang within easy reach of the stove and can be reached without stooping. The platters and baking dishes in the vertical sections can be obtained by taking hold of only the lower portions. The dishes on the top shelf are seldom used. This is the cupboard shown beside the stove in figures 10 and 11 (pages 16 and 17)

Place these vertical partitions on the high shelves (figure 1, page 3) or on the low shelves (figure 12, page 18), since only the lower part of the article in the upper cupboard and the upper part of the article in the lower cupboard need to be taken hold of.

FIGURE 16. THE CELLARWAY STORAGE SPACE

Inadequate storage space in the kitchen shown in figure 12 (page 18) inspired a housewife to have narrow shelves put in the cellarway for extra supplies. By turning the containers at an angle, the labels can be easily read

Separate the mixing bowls (figure 12, page 18) and arrange them, according to frequency of use, on the upper shelves.

Use the low cupboards for large articles only, and place shelves on the doors of these cupboards (figure 1, page 3) to make the articles more easily accessible.

Paint the inside of the cupboards and the shelves in a light color and use no shelf paper.

In kitchens with limited storage space, cupboards or shelves can sometimes be provided in a back room or store room, or even in a cellarway, for the supplies or utensils not used frequently (figure 16, page 22).

Sometimes compartments, or sections of cupboards, may be partitioned off for certain utensils, or for linen, making it easier to reach these things (figure 29, page 43).

Cupboard drawers

Drawers in kitchen cupboards are often a source of irritation and inconvenience because of their depth and because of the number of miscellaneous articles kept in them. It is as much as any one's temper will stand to "paw" around in a drawer for a paring knife, possibly cutting one's finger in the process, and then to find that the knife is too dull for use. Other small articles are equally difficult to find when kept in the ordinary drawer. Drawers may be

FIGURE 17. A DRAWER FOR SILVER

This drawer for silver has first been partitioned, then cleats have been nailed to both sides of each partition. Trays with ends but no sides run back and forth easily on these cleats and can be lifted out if desired. Drawers for kitchen utensils and for linen may be improved in a similar way. Unpartitioned drawers may have trays alone

partitioned to form compartments for certain pieces of equipment, and sliding trays may be made for deep drawers so that all available space may be used (figure 17). Knives may be hung where used or placed in a knife rack so that their edges will not be dulled by coming in contact with other metal (cover illustration).

Food-storage center

The food-storage center is used in connection with the food-preparation center, the sink, and the dining table; this suggests that the food-storage center be as central to these units as possible. A counter or table beside the refrigerator (figure 6, page 11) is convenient when taking out or putting away food. Shelves or a cupboard over this counter are also useful for storing refrigerator dishes. Since it is impossible to have the refrigerator next to each of the centers with which it is used, it is advisable to have a hand tray, a basket, or a service wagon to carry food to and from these centers. In purchasing a refrigerator it is necessary to keep the position it is to occupy in mind, and then to be sure that the door is so hinged that it will be unnecessary to walk around the door to get what is inside the refrigerator (figure 6, page 11). It may be necessary to ask the dealer to order a refrigerator with the door opening the right way, but the added convenience will be worth the trouble.

The location of the refrigerator in the kitchen requires careful weighing of values. It is unfortunate to sacrifice convenience for the sake of

saving the few additional cents in the cost of operation if the refrigerator is placed in a warm kitchen. In some houses the refrigerator may be placed in a back room or pantry and open into the kitchen (figure 18). The refrigerator door is then flush with the wall, giving more room in the kitchen. A mechanical refrigerator should not be entirely built in or completely surrounded with cupboards, as a free circulation of air around the refrigerator is necessary to carry away the heat extracted from the food. If a refrigerator has been completely enclosed, the back of the cupboards and the door panels can be replaced by wire screening to give air circulation. A separate outlet and a separate fuse for the refrigerator is desirable.

Science tells us that as the temperature decreases, the development of harmful bacteria in food is checked. For this reason it is important to

FIGURE 18. RECESSED REFRIGERATOR

Floor space has been conserved in this kitchen by placing the refrigerator in the back room and opening it into the kitchen. Notice the washstand at the left of the sink, also the spice shelf, the knife rack, the paper-towel rack, and the order pad

FIGURE 19. A DUMB-WAITER IN PLACE IN THE KITCHEN

A cupboard drops down into a screened basement. When not in use, the top of the cupboard forms a section of the floor and is fastened by the latch at the right. The cupboard is weighted by a pulley in the cellar (figure 21). A narrow shelf over the sink and a continuous working surface around the corner meets the stove. The three faucets indicate soft, as well as hard, running water

FIGURE 20. A DUMB-WAITER IN MOTION

FIGURE 21. A DUMB-WAITER IN THE BASEMENT

As the latch is released and the cupboard is pulled up with the poker, it continues to rise automatically because of the weights. In the basement a heavy rope extends around the bottom and up the sides of the cupboard, and the ends of the rope, to which weights are fastened, pass over two wooden spools which serve as pulleys. When the latch is open, the weights pull down and the cupboard rises. Notice the bag of sand and the pieces of old iron used as weights

FIGURE 22. A COLD CLOSET

This closet has been divided to form a cleaning closet, storage closet, and a cold cupboard for food. The section covered by the small door has had the floor replaced by heavy wire grating through which cool air enters from a ventilated flue in the cellar. The shelves are also of grating

keep food as cool as possible without danger of freezing. Good mechanical refrigerators which maintain a temperature of between 45° and 50° F. fail to operate in a freezing temperature. Five types of refrigerators are on the market: ice, electric, gas, oil, and a hand-operated machine using a chemical refrigerant. The type chosen will probably depend upon the availability and cost of these facilities.

If the cost of a refrigerator is prohibitive, food is usually kept cool in the cellar or in a "cold pantry." This means a good deal of travel in getting food and putting it away. A dumb waiter (figures 19, 20 and 21, page 25) is a great labor-saver if food is kept in the cellar, and it is not expensive to build. In some kitchens a section of the floor in a cupboard may be removed (figure 22, page 26) and replaced by wire grating to allow the cool air from the cellar to enter the cupboard, and all the shelves may likewise be made of wire grating for good circulation of air. It is important that the cellar air be pure and that the cellar be screened and ventilated from outside. It is well to have the dumb waiter or the cold cupboard open into a flue ventilated from the outside. Food kept in such a cold cupboard or dumb waiter should always be covered. If no cellar is under the kitchen, an opening which can be closed if desired may be cut through from a cold cupboard to a back room or cellarway or even to the outside. Such a cupboard may freeze in the coldest days of winter and may not be cool enough in the summer; still it will be more convenient than keeping food in an inconvenient cellar the year around.

Planning center

A planning center in a kitchen (figures 23 and 24, pages 27 and 28) is an invitation to sit down and plan meals ahead for several days, to plan grocery orders, to keep accounts, and to plan in a general way the day's activities. Ten to fifteen minutes spent at the planning center each day, preferably after breakfast when members of the family have left and the house is quiet, or perhaps in the evening, may mean the difference between a successful and an unsuccessful day. Planning centers may be simple or elaborate. All that is necessary is a flat surface on which to write, good light (from the left, if possible), a few shelves for books and files, and perhaps a drawer for desk equipment.

Dining center

A dining center in the kitchen for eating at least one meal a day is a great convenience if the kitchen is large enough. The table may be in a part of the room away from the main work center, perhaps in front of

FIGURE 23. BUSINESS CENTER (RIGHT) CLOSED

A business-like homemaker wanted a planning center in her kitchen where she could sit down after her husband had left in the morning and plan her day's activities, her meals, and her expenditures, and take care of any other household business which needed her attention. Her husband planned and built the business center shown, consisting of a hinged shelf and spaces for books and records. The apartment is adequately heated and the radiator in the kitchen is never used. The cans are a decorative bit of color in this kitchen. This center is shown in detail in figure 24 (page 28)

FIGURE 24. BUSINESS CENTER READY FOR USE

The door of the ironing-board closet shown here makes an excellent bulletin board for the records which this woman uses often. Good ventilation in this kitchen is possible because windows open from the top and the curtains do not obstruct the circulation of air. The home-made cabinet is convenient and attractive. The movable table under the work table is the right height for the wash tub, which is used at the sink for lack of a separate laundry. The convenience and business-like methods in this home make it possible for this homemaker to carry a part-time job when she wishes

windows with a pleasant outlook. A double convenience outlet at the height of the table should be provided, if electricity is available, for the toaster, waffle iron, or percolator. This may also be used for an electric iron if ironing has to be done in the kitchen. A dining table equipped with swivel casters can be easily moved to the sink or stove to serve as a supplemenary work table. A table in the center of the room often means wasted energy, for it may be in the way between pieces of equipment. To avoid this, a drop-leaf table may be pulled to the center of the room at

meal time, and later may be pushed to the wall and the leaf dropped out of the way. The same table may be used for a dining center and planning center.

Laundry center

For sanitary reasons as well as convenience a separate laundry is desirable. A back room or a discarded pantry may be used. If one has a choice, it is more convenient to have the laundry on the main floor than in the cellar, to avoid trips to the cellar. If a separate laundry cannot be arranged, the kitchen is generally used for laundry purposes. The washing machine is usually kept in the back room and is moved into and out of the kitchen every wash day. If the washing machine is in the kitchen near the place where it is used, a cover on casters may be made from lumber or wall board and may easily be wheeled to cover the machine when it is not in use. If one sees no future possibility of having a separate laundry room, it is sometimes wise to install laundry tubs beside the sink. A cover over these gives an additional working surface, but such a cover should be ventilated. If made of heavy wire, dishes may be scalded on it. If an electric washing machine is to be used in the kitchen, a convenience outlet should be near the washer and as high in the wall as the machine. The switch and outlet plates should be of bakelite and the plug of rubber, and they should be so placed that possibility of shock by grounding through the water pipes will be avoided.

The kitchen is not always the most suitable or desirable place to iron, but in many homes there is no better place. A portable ironing board wastes energy, whereas a built-in ironing board saves steps and is a great convenience. An ironing-board cupboard may be set into the wall itself, with the ironing board hinged at the correct height for ironing, or a special cupboard may be built for this purpose. Hinging an ironing board on a door or even on a wall is sometimes practicable. The board may be covered by a slip cover the color of the wall or it may be protected by a curtain. Sometimes it is desirable to keep the ironing board standing and to have an oilcloth cover for it, thus providing an additional work surface when the ironing board is not in use. The plug for an electric iron should be higher than the ironing board.

ARRANGEMENT OF KITCHEN WORK CENTERS IN RELATION TO ONE ANOTHER

No hard and fast rule can be made for the best size of a kitchen nor for the best arrangement of work centers in it. More time and energy may be used up in a small, compactly arranged kitchen than in one which is larger and more inconveniently arranged; much depends upon the equip-

ment itself and the way the kitchen is used. Travel is not necessarily the most fatiguing of all kitchen activities, but whenever it can be eliminated more time and energy will be left for something else. The suggestions in the following paragraphs, based on the experiences of many homemakers, may help in planning one's kitchen.

If the sink is at the left of the cabinet or work table, soiled dishes can be washed or put to soak by taking only a step. The cabinet or work table can also be used for stacking soiled dishes. However, one should also consider the convenience of having the cabinet at the left end of the sink.

If the stove is at the right of the cabinet or on an adjoining wall, the trip from the stove to the cabinet and from the stove to the sink will be short. With this arrangement the hot-water reservoir would be more convenient on the left of the coal or wood range. However, it is well also to consider the convenience of having the stove at the left of the cabinet.

FIGURE 25. AN INCONVENIENT DISHWASHING CENTER HAS BEEN IMPROVED

A sink between two doors is always a problem. The drainboard at the right of the sink is hinged to the wall and when not in use can be fastened to the wall behind the door. By locking the living-room door, to avoid an accident while this shelf is in use, the arrangement is as convenient as if the door were not there. The small space at the left of the sink has been utilized by a series of three shelves. Dish pans are more easily reached from a shelf under the sink or drainboard than from hooks. Rods on the back of the dining-room door provide a good place for dish towels. When the door is open, the towels are out of sight

If these three main working units are arranged around two or three adjoining walls of the kitchen which are not broken by doors, and, if they are connected to form a continuous working surface, time and energy can be saved by pushing or reaching instead of picking up utensils, turning, and carrying. If doors are so arranged that such an unbroken wall space is impossible, a temporary continuous surface may be provided by a drop-leaf (figure 25, page 30), a table with swivel casters (figure 26, page 31), or both.

FIGURE 26. SERVICE WAGON MADE FROM A WASHSTAND

If a working surface with cupboards above can be placed at the left of the sink, dishes may be put into the cupboard as soon as dried, without extra travel. This arrangement should be compared with that of a dish cupboard at the right of the sink.

With the refrigerator at the left of the dish cupboard, salads and desserts can be easily prepared and vegetables and fruit cleaned and put into the refrigerator. One may compare this in convenience with the refrigerator at the right of the cabinet.

A kitchen is usually easier to work in if all doors opening into it are at one end and if there is no passage way through the work center.

If two or three persons are to work in the kitchen at the same time, more space will be needed than if it is to be a one-person kitchen.

A service wagon will cut down travel where work centers cannot be conveniently arranged in relation to one another.

SANITARY CONDITIONS IN THE KITCHEN

Health and enjoyment are affected by the sanitary conditions under which food is prepared, served, cleared away, and stored. The best health of the family will be insured:

If an adequate supply of hot running water is provided in the kitchen, and if a satisfactory sewage-disposal system, cesspool, or septic tank is present.

If a bath room, or lavatory at least, is provided off the kitchen in order that the family may not wash their hands at the kitchen sink.

If a general work room off the kitchen is provided where laundering and other types of dirty work can be done and where outdoor wraps can be hung. Such a room needs to be heated separately. A back room or large pantry can often be used in this way. A combination laundry and bath room is often practical.

If windows are provided with full-length screens which fit tightly, and if outside doors are adequately screened.

If food is kept in a refrigerator, or other place where the temperature is cool enough to prevent the rapid growth of bacteria.

If the cellar is well ventilated and tightly screened so that mice and rats cannot enter, and if it is kept free from rotting vegetables, rubbish, and decayed organic matter.

If the back yard is free from stagnant water and decaying organic matter which attract flies and other household pests.

If a flagstone or cement walk is provided from the back door to the out-buildings so that barnyard soil is not tracked into the kitchen.

Other individual factors that may influence the sanitary condition in the kitchen will almost surely be found. To some persons the appearance of insanitary conditions is almost as harmful as the conditions themselves.

AIR CONDITION IN THE KITCHEN

The following bad conditions of air in the kitchen may cause fatigue: lack of sufficient oxygen, or an excess of carbon dioxide, and the presence of carbon monoxide, excessive moisture, and excessive heat. Most kitchens have sufficient cracks around windows and doors to provide enough oxygen, but even when ventilation is satisfactory and sufficient oxygen is present, one can become tired and uncomfortable if the air in the room is too warm and moist. Such discomfort is common in kitchens where excessive heat and moisture are produced by the cookstove and the cooking processes. A film of warm, moist air next the skin causes discomfort, relief from which may be obtained through removing the film of air by fanning or by some other means.

Heating stoves in a kitchen produce too great heat in some parts of the room and too little in others, thus creating drafts, cold floors, and discomfort.

Since warm air rises, windows which can be opened at the top will allow the too-moist and too-warm air to escape without creating drafts or making the floor cold.

Kitchens do not have the best natural ventilation if but one window is present or if the windows are all one side of the room, or if the stove is so placed in an unventilated corner that the worker's head, as she stands

at it, is in a pocket of moist, warm air. In such a situation it is especially important that the windows open from top and bottom and that there are no obstructions to the easy movement of air through them. An electric fan placed just above the stove would help also by fanning the air towards the windows. Or a fan combined with a screen could be placed in the upper sash of one of the windows and so adjusted that it could fan air into or out of the room as desired. In some kitchens ventilation is aided by placing a fan in a chimney flue especially provided for the purpose.

Casement windows are popular at present, but they are not such good ventilators as are those that open from the top and bottom. They may be in the way, difficult to adjust, likely to be broken, and they cause drafts. A single window can be hinged at the bottom, thus allowing it to open in from the top, with a chain or rod to regulate the amount of opening.

KITCHEN LIGHTING

Fatigue and headache may be caused by eye strain, and this cause of fatigue is the more important to watch because one may suffer from poor lighting conditions and not know it. Eye strain may come from too glaring a light or too little light, or lights badly placed so that they either shoot uncomfortably into the eye or throw the shadow of head or hands over the work.

A common cause of eye strain in the kitchen is unshaded or unfrosted electric bulbs. The best lighting for a kitchen, so far tested, is a diffused light or one which is as nearly like daylight as possible.[2] This is produced by an enclosed, semi-transparent unit placed near the ceiling to prevent shadows. In an average-sized kitchen, a 100-watt bulb is usually sufficient. In a very large kitchen, a 150-watt bulb may be needed; in a long narrow kitchen, two lighting units will give better light. The size of the bulb needed, however, will depend partly upon the percentage of light reflected by the walls and ceiling of the room. The additional light usually needed over each work center may be supplied by a bracket or drop light so shaded and placed that the bulb is not visible to the eye and the light falls directly on the working surface. The lighting unit in figure 2 (page 4) is not difficult to make; it is a metal box with reflecting surfaces and a frosted glass base in which electric light bulbs are placed. Working counters may be properly lighted by bulbs concealed back under the cupboards (figure 13, page 19), which are above them. Although the light from oil lamps is not so bright as that from electric lights, lamps also need

[2]Home and school lighting, by Florence E. Wright. Bulletin of the New York State College of Home Economics.
Electric wiring for the farm, by F. B. Wright and B. B. Robb. Cornell Extension Bulletin 204 (revised 1936). 1931.

to be properly shaded and so placed with reflectors that the light will fall on the work surface rather than into the worker's eyes.

Glare may be caused by natural light as well as by artificial light. Before placing a sink before a window—an arrangement that looks delightful in advertisements—one should consider whether the glare of sun on snow or water or a sunny meadow is going to cause eye strain. Although this is often the case, a woman may still wish to wash dishes with her eyes on a view or on the children's play-ground; then an awning, Venetian blinds, vines, curtains on rings, the protection of a porch, or a window with north exposure will help to reduce the glare.

So far, direct light only has been discussed. Reflected light is also an important factor in kitchens. For example, dark brown varnished walls and woodwork reflect approximately 19 per cent of the light which reaches them,[3] and absorb approximately 81 per cent. This means that dark walls are expensive, since the bill for artificial light will be considerably higher than would be the case if the walls had greater reflective power. Those who object to painting the native grain of the wood might do well to figure the cost of keeping such woodwork. Ivory paint reflects approximately 70 per cent of the light, while the reflective factor of ivory-white is around 80 per cent and that of buff about 63 per cent. Women who have changed the color scheme of their kitchen from a gray or dark brown to a lighter color report that they find it just as easy to keep the woodwork clean as they did before, and the light walls make them feel more cheerful. A glossy finish causes glare, yet a flat paint collects dirt and is hard to clean. A semi-gloss paint is probably most suitable for a kitchen, since it is easy to clean and prevents glare. If the kitchen has sufficient natural and artificial light, walls which reflect between 60 and 70 per cent of the light are usually found to be satisfactory. In many kitchens white or ivory-white walls, reflecting as much as 80 per cent of light, will be too glaring. Ceilings, however, may be painted as light as this, since that light is reflected down and not into the eyes.

HEIGHTS OF WORK SURFACES

Poor posture may cause fatigue. Stooping over a low sink, table, or other work surface has a tendency both to crowd the lungs, so that there is not sufficient oxygen to burn up fatigue poisons, and also to push the abdominal organs down, a common complaint of women, causing a discomfort and irritation which constant standing aggravates. Aside from the effect of poor posture on health, the effect on appearance should also be considered, for women with a slight stoop and protruding abdomen look

[3]For reflective factors of light, see *Artificial Light and Its Application in the Home*, p. 19-21. (Published by McGraw-Hill Book Co., New York City. 1932.)

older than their years. They find it difficult to buy dresses that fit, and still more difficult to make those that fit. Although low work surfaces are not the only cause of poor posture, they have a decided effect on posture and health, and this fact should therefore be considered in planning a fatigue-reducing kitchen.

Many women do not know whether or not the sink is at the most comfortable height, and therefore assume that it is right. In many instances women have declared that the work surfaces were the best height for them, but on experimenting have discovered a different height to be more comfortable. Some interesting studies have been made to determine correct working heights, but the most satisfactory procedure is for each individual to find for herself her most comfortable working height. The following method is simple: Place a board or pie tin under your dish pan. If this gives you some relief, add another board when you wash dishes again. Continue this procedure until you are conscious that the pan is too high. Then remove the top board and wash dishes with the pan at this height for at least a week to be sure it is comfortable. Then measure from the bottom of the dishpan to the floor. This distance will be the correct distance to place the bottom of a standard 6-inch sink from the floor. If the sink is deeper than a standard-depth sink, a dish-pan rack may be needed to bring the top of the dish pan approximately to the top of the sink. If the sink cannot be raised, a dish-pan rack of the right height can be used.

The height of the work table can be checked in the same way. A number of tests have shown that when the table has been tested for such operations as beating eggs or stirring, in which the hands are somewhat above the surface of the table, the height of the bottom of the sink and the top of the work table are approximately the same (figure 1, page 3). However, this is not given as an infallible rule. Certain operations such as making salads are carried on with the hands close to the work surface, and in such operations a surface even with the top of the sink might be better. A number of women have found that they are unable to use a work surface which is even with the top of the sink of correct height, for such operations as beating or stirring, because it is too high. It is well to be sure of the most comfortable heights before installing built-in equipment. Cabinets or tables can be raised or lowered (figure 27, page 36) as desired. It is well to have some surfaces of different heights in the kitchen, particularly if there are children in the family who enjoy helping with kitchen work. The height of the stove is often neglected, but this piece of equipment should also be checked and raised if necessary. Some modern stoves have interchangeable legs of different lengths. The position of the oven (figure 28, page 36) may affect one's posture.

Since constant standing aggravates the condition of sagging abdominal organs, less fatigue may result if some kitchen work is done sitting down. Studies show that it requires considerably more energy to stand than to sit. Some women prefer to stand rather than to sit, but this preference may be due to the fact that the stool is not of a comfortable height or that there is not room for the knees under the work table.

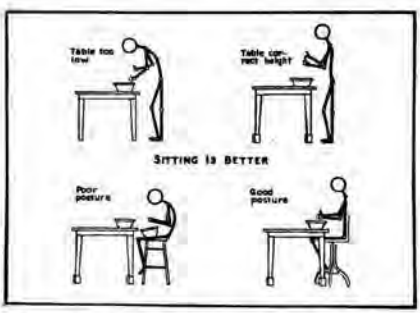

FIGURE 27. POSTURE WHEN PARING VEGETABLES

(Drawing from the Bureau of Home Economics of the United States Department of Agriculture)

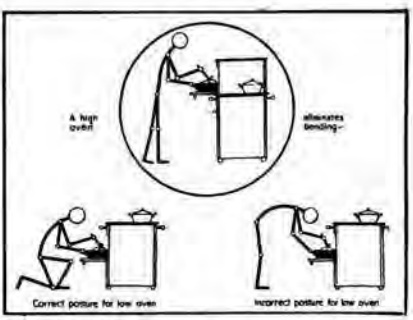

FIGURE 28. POSTURE WHEN WORKING AT OVEN

(Drawing from the Bureau of Home Economics of the United States Department of Agriculture)

If the stool is too low, it can be built up with books or boards until the most comfortable height has been found, then it can be made permanently that height. If it is too high, it is well to experiment with a chair or a box until the best height has been discovered, then the stool can be made this height by shortening the legs. A foot rest on a stool is a comfort. If one plans to buy a metal stool, it is well to determine the correct height before buying.

When sitting to work, it should be possible to get the knees under the work surface, as at a cabinet with a leaf that pulls out (figure 13, page 19), or a table without a drawer or with a very shallow one. By rearranging cupboard shelving one may be able to take out the lower cupboards, thereby forming a work surface where the worker can sit comfortably. It is well to vary sitting with standing activities in the kitchen.

SURFACE FINISHES

Finishes for work surfaces

Hardwood surfaces treated with boiled linseed oil and turpentine are probably as economical as any. These are not satisfactory, however, unless properly treated and cared for, and if neglected can become very insanitary. The directions used for oiling a floor are satisfactory for oiling work

surfaces (page 38). Spar varnish makes a good surface finish, but is not durable. Liquid bakelite has proved to be an excellent finish for this purpose, since it is not affected by heat, water, alkali, acid, or alcohol; directions for applying and using it should be followed carefully.

Work surfaces covered with linoleum and felt-back floor covering are satisfactory if the materials are cemented to the wood and weighted down to dry, and the edges are protected by a molding. Such surfaces are attractive, easily cleaned, resilient, and reasonably durable. They may be protected by varnish or liquid bakelite if desired.

Enameled iron surfaces can be purchased for tables of different sizes. Work surfaces can also be covered with zinc or stainless metals, which have the advantage of being heat resistant. Zinc, however, is hard to keep clean, and stainless metal is relatively expensive.

Finishes for cupboard shelves

Painted or enameled cupboard shelves can be made to add to the beauty of the kitchen and they are easy to wipe off when soiled, making shelf paper unnecessary. Cupboards are easier to use and to keep clean if they are light rather than dark.

Wall finishes

Painted walls and woodwork are sanitary since grease is not absorbed, dirt can be easily removed, and the washing of these walls is probably no harder physically than is repapering. Some persons find it satisfactory to cover the lower part of the kitchen with oil cloth and the upper part with paper, but the type of finish most suitable will depend largely upon the condition of the walls. Walls in bad condition can sometimes be improved by covering them with wall board, which is then painted or papered. Tile, imitation tile, pressed wood, linoleum, and other composition wall materials that are attractive and easy to clean are on the market. It is well to investigate the cost and wearing qualities of any new materials before selecting them.

FLOOR FINISHES AND COVERINGS

Kitchen floors may be cold, uneven, rough, unattractive; they may require much time and energy to keep clean; or they may be wearing out because they have not been properly protected and cleaned. If the floor is habitually cold in winter, the foundation should be made tight and the doors should be provided with thresholds or weatherstripping. A good way to improve a cold uneven floor is to lay another floor over it, with water-proof building paper placed between the two floors for extra

warmth. If the kitchen floor is lower than that of the other rooms, the second floor can be raised to their level, provided the ceiling is high enough, thus giving an air space between the two which will mean still greater warmth.

Since a floor covering placed over a rough floor will wear out in a short time, it is usually wiser to put money and energy into leveling the existing floor, or in laying a second floor of inexpensive wood and choosing a finish which will keep it in good condition, later adding the desired floor covering.

Bare floors[4]

An unfinished bare kitchen floor is hard to keep clean and attractive because it absorbs grease, stains, and dirty water, and is also apt to splinter. Bare kitchen floors can be finished by oiling, by varnishing, by applying liquid bakelite, by painting, or by using other preparations made for the purpose. Wax is not suitable for a kitchen floor, because it is slippery and water spots it.

Oiled floors are the most durable and inexpensive, but if not properly oiled are unattractive. One part of boiled linseed oil to one of turpentine gives good results. This mixture may be heated by setting it in a pan of hot water to make it penetrate more easily, but it should not be set on the stove, as the turpentine may explode. The oil should be applied with the grain of the wood and rubbed in well, then all excess oil should be wiped off with a dry cloth. When the oil is dry, the floor should be polished with a soft woolen cloth. Most floors will absorb two coats of oil. When the floor is finished, all oily cloths should be burned to prevent fire from spontaneous combustion. Oiling darkens floors, but makes a beautiful finish on maples and preserves the wood.

Varnished and painted floors are more expensive and less durable than oiled floors, and it is more work to keep them in good shape, since the paint or varnish soon wears through in the most-used places. As the spots cannot be patched to look well, it too often means the resurfacing of the entire floor once or twice a year. In time, the finish becomes thick in some places and thin in others, therefore occasionally all the varnish or paint must be entirely removed and the floor refinished. This is a great deal of work. Liquid bakelite is now being used to some extent on kitchen floors, as it is more resilient than varnish and is unaffected by acids, alkalis, heat, and water. It requires more time to dry.

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[4]For further information on the treatment of bare floors, see *Painting and Decorating Working Methods*, p. 222–230. (Published by Theo. Audel, New York City.)

Printed floor covering

Worn floor covering is unattractive and hard to care for, yet new floor covering every few years is expensive. The life and attractiveness of any floor covering depends greatly upon the protection and care it receives. The more a woman knows about kitchen floor coverings, how they are made, and what they are made of, the more wisely is she able to select and care for them and the greater satisfaction will they give.

Printed floor coverings fall into two classes: (1) printed linoleum and (2) felt-back floor covering. Printed linoleum is simply thin linoleum on which a pattern has been painted. It is used less than formerly because the difference in price between it and the heavier linoleum, from which the pattern will not wear, is not great. A better grade of felt-back floor covering is being made now than formerly. The foundation is felt made from old rags or other material, saturated with asphaltum to make it waterproof, and finished with several coats of oil paint on which a design is printed. The back is usually painted and waxed.

Felt-back floor covering can be bought both by the yard and in rug form. Wherever possible it is better to cover the entire floor, as the edges are easily broken. As a rule the colors and designs are not so good in printed floor coverings as in the more expensive linoleum and rubber tiles, although better designs have appeared in the past few years.

Linoleum

Inlaid or plain linoleum is made from a mixture of oxidized linseed oil, powdered cork, resins, and color pigments pressed onto a burlap back. It is resilient and comfortable to stand on and is more durable than printed floor covering. Although the first cost is greater, the designs are better and will not wear off, since they extend through to the back. A medium quality of inlaid linoleum should, if properly laid, protected, and cleaned, last a life-time.

The method of laying inlaid or plain linoleum has a good deal to do with its durability. One method of laying is to have it cut a little smaller than the floor and then before it is fastened down allow it to lie for two or three weeks or until it has ceased to stretch. Even so it sometimes stretches and buckles after it has been fastened, and this buckling is almost certain to cause cracks. If laid in this way, there is always danger of water running underneath and rotting out the linoleum at the seams.

A much safer method is to cement felt to the floor with linoleum cement, and then cement the linoleum to the felt. Waterproof cement should be used for three or four inches along all seams to prevent water from running underneath. It takes a skilled person and special equipment to lay

linoleum this way, for if it is not properly laid it may buckle and crack. It is good economy to have the linoleum cemented down by a skilled person.

Care of printed floor covering

The protection and care given to a kitchen floor covering have much to do with its length of service. Since in printed floor coverings the surface design wears off before the covering wears out, it is advisable to protect this kind of floor covering with a coat of spar varnish or liquid bakelite. As these tend to darken the floor covering, many persons prefer to use clear linoleum varnish, which dries more quickly but also wears off more quickly. Where a very light linoleum has been chosen, the darkening effect of the varnish may be a good thing. As a general rule, the longer it takes a finish to dry, the longer it will last.

The kind of wear a floor covering receives determines to a certain extent its length of life. If mud and sand are tracked steadily into the kitchen the top surface will suffer in spite of all the care a homemaker can give it. In this case family cooperation in the matter of wiping one's feet before entering the kitchen will save money, strength, time, and dispositions. Strong soap will eat and roughen the surface of linoleum, and coarse scouring powder will remove the top surface just as sand will. If a powder seems necessary, whiting soap paste or some scouring powder as fine as whiting should be used. The paste can be made at home,[5] for whiting is simply powdered chalk which can be purchased at a hardware store for about five cents a pound.

If a printed floor covering is worn off and unsightly, it can be repainted and then finished with liquid bakelite or varnish. A bathroom floor which had been repainted, then stippled, and a coat of liquid bakelite added was observed by the writer. The stippling to a great extent kept the floor from showing footprints. Another printed floor covering with a tile pattern was badly worn in front of the sink. The owner matched the paints, restored the pattern, and protected the new paint with a coat of varnish. The effect was a new floor covering. Since floor coverings wear off more quickly in front of stoves, sinks, and cabinets, it is well to reinforce the oblong space in front of these work centers with varnish or liquid bakelite. When this extra coat is put on along the line of the pattern it is scarcely noticeable, and is less objectionable than either worn spots or frequent revarnishing of the entire floor.

[5]For directions for making this paste, see *Letters from a homemaker to her friend on housecleaning*, p. 12–13, by Ella M. Cushman. Cornell Extension Bulletin 262. 1933.

Care of linoleum

If the surface of linoleum seems rough and the dirt is hard to remove, it was probably purchased before manufacturers started applying a surface finish at the factory. In this case it would be wise to lacquer, varnish, or wax the surface.

It must be borne in mind that wax makes a slippery floor unless applied sparingly and rubbed in well. It also shows water spots, and is generally hard to care for in a kitchen. Water emulsion wax, or so-called "no-rub wax," is easy to apply and requires no polishing. It is slippery, however, and needs to be applied every two or three weeks, depending upon the wear it receives.

Linoleum now comes waxed or lacquered according to the finish applied at the factory. Lacquered linoleum is less slippery than waxed. Occasionally is has to be re-lacquered or re-varnished. This gives it a shiny appearance. Manufacturers do not recommend varnishing linoleum because the varnish is likely to crack, since the linoleum is more resilient than the varnish. For this reason liquid bakelite, which is resilient, might be more satisfactory. Lacquer should never be applied to a surface which has been varnished, since lacquer contains the foundation varnish remover and would cause the varnish beneath to peel off. Before refinishing linoleum, one should find what kind of finish has been applied at the factory.

If it is desired to lacquer or varnish waxed linoleum, all the wax should be first removed with benzine or gasoline—this should be done with windows open and with no fire in the stove and care should be taken not to create friction in rubbing. Then the floor should be washed with mild soap and rinsed with clear water. If the linoleum still looks soiled, the dark spots can be removed by the use of the finest steel wool. The lacquer should then be applied according to the directions on the can. If the wax is not all removed, the lacquer will not stick. Double-waxed linoleum should not be lacquered or varnished. Some women merely mop their linoleum with mild soap and water, and once or twice a year rub in a little hot linseed oil. This keeps it soft and resilient and does away with the bother of applying a surface finish.

Other floor finishes and coverings

Rubber is one of the newer floor coverings for residences. It is more expensive than linoleum, but is more resilient. It is durable, easily kept clean, and comes in good colors. Rubber flooring comes in the form of tiles which are cemented to the floor, or in rolls like linoleum. It can be laid over an old wood floor, provided the floor is properly prepared.

Directions given by the manufacturer should be followed in cleaning rubber floors. As oil and turpentine are rubber solvents, they should never be used on rubber floors.

New kinds of floor finishes and coverings are continually being put on the market and can be read about in magazine advertisements. It is well to keep watch of the wearing qualities of these new products, for the kitchen-floor problem has not yet been satisfactorily solved.

ADDING CHARM TO THE KITCHEN

No serious conflict need exist between beauty and convenience in the kitchen if principles of good design, including appropriateness, are applied. For example, the simple lines of the curtains pulled to the sides which softly frame a window and emphasize a beautiful view without shutting out light and air are more restful than are the broken lines of fussy, beruffled curtains covering the glass, which shut out light and air, conceal the view, and draw attention to themselves. A valance in particular makes the ceiling appear lower, breaks the simple lines, and interferes with the circulation of air when the window is open from the top.

To many homemakers, kitchen utensils mean drudgery, and therefore to see a sauce pan hanging out in the kitchen gives them an unhappy feeling. Other women dislike utensils in sight not because they have an unpleasant significance but because their appearance, scattered here and there in the kitchen, is confusing. This may be because their arrangement lacks design. Women who are artistic by nature may do valuable creative work by so placing a sink or stove shelf that it is not only convenient but in good relation to the structural lines of the room and by arranging the necessary utensils and supplies on these shelves to form a unit or a design.

Good design is dependent upon the selection and arrangement of lines, masses of dark and light, and color. Designs can be made with all sorts of materials from water colors and textiles to growing plants or kitchen utensils. If a utensil in itself is not beautiful it may find a place in a grouping of other utensils to make an interesting whole. Color can be added to shelf arrangements by the use of painted cans, or slip covers made from colored oil cloth or shellacked gay paper for unsightly packages. In general, most persons prefer the floor to be darker than the walls. Walls are preferably of a fairly light and neutral color, such as ivory, cream, buff, or warm gray, with the color scheme and decorative features carried out by curtains, dishes, table linen, painted cans, the insides of cupboards, and, often most important of all, by the kitchen utensils themselves. Col-

ored walls can, however, be charming, although taste and care are required in the choice and amount of the color to be used.

In open cupboards, there is the greatest possibility of contributing charm to the room. Light, neutral paint in the cupboards reflects light and makes a good background for dishes of any color; but, on the other hand, the inside of the cupboard may be the very place to satisfy one's longing for gay color too strong to be used in any great amount in the room itself. Painting the edges of shelves may sometimes be decorative, but one must avoid a spotty effect, which, for example, might follow if door knobs or hinges or door panels or parts of chairs were made over-conspicuous by being singled out for bright spots of paint. Almost any colors can be used successfully together. Home conferences similar to kitchen conferences mentioned on page 6, under the leadership of a person with art background, might well follow kitchen conferences.

FIGURE 29. A WASHSTAND PARTITIONED INTO COMPARTMENTS FOR LINEN

THE HOMEMAKER, THE CENTER OF ATTRACTION IN THE KITCHEN

Since the homemaker herself is the center of attraction in the kitchen, she should look and act the part. She will want to be comfortably and becomingly dressed and well groomed, since to feel that one looks her best is to look her best. Cotton dresses, becoming and in harmony with the kitchen but simply made for easy laundering, and comfortable shoes with heels not too high, are both important. The kitchen is no place to wear bedroom slippers or last year's worn out dress shoes. The woman whose feet are comfortably shod, whose dress is clean and attractive, whose hair, skin, and nails are well cared for, can enjoy her work

more than an untidy woman unsuitably dressed who hobbles around in shoes with run-over heels. She has respect for her job and for herself, and is equally respected by her husband and children.

EXPLANATION OF ILLUSTRATIONS

Photographs of real kitchens rather than pictures of theoretical kitchens have been used in this bulletin because it is always inspiring to know what others are doing to make their kitchens successful. These photographs are used with the understanding on the part of the owners and of the author that many of the kitchens still contain inconveniences which are yet to be overcome. Also, since these kitchens have been improved to meet the needs of individual families, they must of necessity contain features which would be unsatisfactory for other families whose needs and desires are different. It is hoped that not only the conveniences illustrated but also any inconveniences noticed will stimulate the imagination of the reader constructively. If this happens the pictures have served their purpose.

The College is always glad to know of improvements made in any kitchen which might be helpful to others.

CONCERNING REFERENCES

A list of references has intentionally been omitted from this bulletin. Such a list would need explanation and would be too long. Individuals who wish further information on any subject discussed in the bulletin may write to the New York State College of Home Economics, at Cornell University, Ithaca, New York, for suggestions.